

**ABSTRACT OF THE DISCLOSURE**

Plant cell walls play a crucial role in development, signal transduction, and disease resistance. They are made of cellulose and matrix polysaccharides such as hemicelluloses and pectins. Xyloglucan, the principal hemicellulose of dicotyledonous plants, has a terminal fucosyl residue that may affect the extensibility of the cell wall and thus influence plant growth and morphology. The fucosyltransferase (FTase) that adds this residue was purified from pea epicotyls. Peptide sequence information derived from the 62 kDa purified pea FTase made it possible to clone a homologous gene from Arabidopsis. Antibodies raised against recombinant AtFTase immunoprecipitate FTase enzyme activity from solubilized Arabidopsis membrane proteins, and AtFT expressed in mammalian cells retains xyloglucan FTase activity *in vitro*. The availability of this AtFTase sequence offers an opportunity to identify many more plant glycosyltransferases by sequence homology, a task that was not previously possible.